

ii. Beam Current Monitors

These monitors will be very sensitive "DC" transformers having a dynamic range large enough to measure the full circulating current with a resolution and long term stability of better than $10\ \mu\text{A}$. They will be used to monitor both the beam current and the current loss rate. Output from these units will be used in many control programs and will also be a source for a hard-wired beam abort trigger.

iii. Beam Loss Monitor System

The main functions of the Beam Loss Monitor (BLM) system for RHIC are:

1. To provide an abort signal to avoid quenching the superconducting magnets.
2. To provide a history (postmortem) of the losses preceding an abort to help identify the source of the problem.
3. To provide spatial and temporal loss data to assist in tuning the beam to reduce the losses. The RHIC BLM System will not be used for personnel protection.

The quench thresholds are taken as $2\ \text{mJ/g}$ for "fast" losses and $8\ \text{mW/g}$ for "slow" losses, where "fast" and "slow" are relative to the time-constant (100 msec) with which the cryogenic system can remove heat from the coils.

Data from the BLM system will be stored in a circular buffer which will stop on an abort to help diagnose the fault which led to the beam dump. The loss data in local memory will cover a period of about 10 sec, comparable to the BPM data.

The detectors will be placed at locations where they will be most sensitive to beam loss which might quench the magnets. The average spacing will be about 15 m. Relocatable units will be placed near injection or extraction equipment, or at temporary problem areas, where control of losses is especially critical. The distribution of detectors is shown in Table 8-3. The electronics will be located in 24 alcoves and houses around the RHIC tunnel in the same racks as the BPM electronics. By using a modular design significant system expansion can be provided by adding more VXI/VME cards or crates.